Notebook, N-95-01-24

This notebook contains dated entries from January 1895. All entries are by Edison. At the beginning of the book are notes and drawings regarding the phonograph, including notes and hypotheses relating to phonograph diaphragms and sound reproduction. There are also notes, drawings, and cost calculations pertaining to ore milling. The pages are unnumbered, and the book has been used in both directions. Several pages have been removed from the book. Approximately 130 pages have been used.

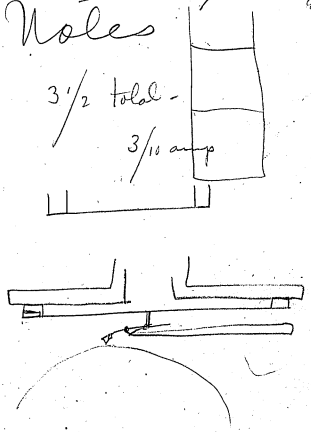
XE172 N950124

Notes

3 1/2 total -

3/10 amp

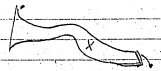
1/10 amp for [illegible]



Expt 1

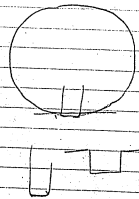
Bore 1/8 hole through floor,
~~and~~ ~~attached pressure~~
Cap No 36 also thread & test
Dia for Mouse & space
a la Lovers latch =

Ear has a resonant tube

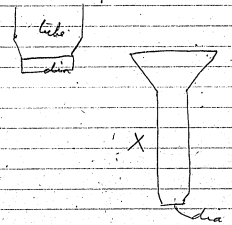


dia dia .350/1000
X 2 inches long or 5.7 times
dia of Drum - if ours
is proportional it should be
about 12 long
X is about 1 1/2 times dia or 1/2
wide - hence ours should
be 3 inches dia this seems
too much by diff dia

.350) 2000 (5.7
1750
2500
2450
50



perhaps the thin chamber of phono which is absent in Ear Reverberates, hence it would be better not to have the Chamber on receiving but a tube 12 long & 3" dia



Reverberations are minimized by glass & vibrating bodies hence perhaps a Leather horn X would be better so as not to give reverbrations

As in all our Experiments
with new Receiver Operator
ele & the .10 @ .15 high note
Keys failed to come out
The friction method may be
defective in reproducing fine
vibrations that improvement
showed to made on it &
~~all~~ the same records
showing these defects should
be listed with other
reproducers —

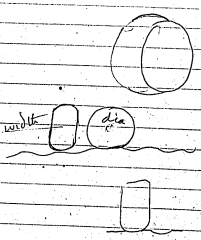
In all long tubes or funnels
sounds are muffled &
fine notes & speech down
with perfect Receiver
fail although speech is
normal through the
Reg speaking tube

Jan 24/95

Evidently there is a great disturbance of the proper vibration of the diaphragm by the friction of the point in tracking into varying fractions during vibration. The more brittle & less tenacious the material is the less this disturbance — as a definite tracking is required, hence there will be a definite friction whether the sounds are strong or weak hence the friction might be a small factor. Both loud sounds is a great factor with weak ~~sou~~ sounds. hence the very weak sounds must have friction reduced to a minimum (which can be done by light tracking & better by using a 5/1000 Cutter. It is very probable that the diaphragm vibrate truly to the sound & the

11

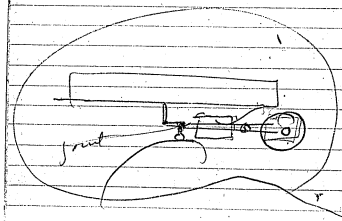
But perhaps the reproducer should be same curvature as cutter in one way & twice the dia the other way if double speed



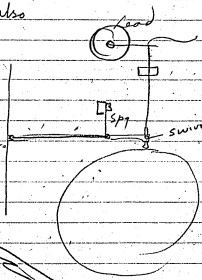
Jan 24/95

disturbance is small due to the friction of the point. I have noticed that heavy sounds come out abnormally on very hard material with extremely light tracking. Turn for instance the heavy excedes the vowel sounds. 400 threads to inch is the only way sounds from Diaphonal can be taken & point should be 3 @ 5/1000 dia to get depth without width

As the friction doesn't increase with the speed of cylinder the wearing properties of the record can be increased by doubling the speed. Thus we can 1/2 the friction by taking out 1/2 the wax chips & at the same time make total amt of wax forming and undercutting the same hence the wear will be same as double width & 1/2 speed. So approx

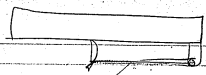


Wrshomed try 3@5/1000 glass
in regard were no mop but
ground metal.
also



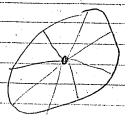
also

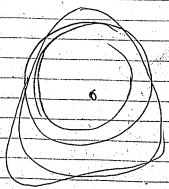
Jany 24 1875



This probably should be
wood to lighten - perhaps
whalebone, duladayed fibre etc,
The Experts should be made with flows
hard recording points,
adjustable as to angle easily
say shellac to hold the wedge on
side - some 1/8 @ 3/16 long to
facilitate adjustment,

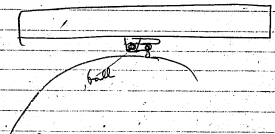
In recording as well
as reproducing the
diaphragm probably
want to continue vibrating
after the waves have ceased
or a fundamental having
ceased the overtones want to
continue a longer than they
should hence a big
heather dampening pad





Jany 24 1895

might be a fuse on each

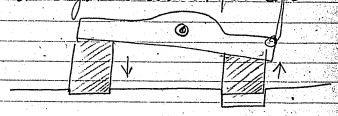


Ball joint with friction
Spring acting enough to overcome
friction hence reconstruction
of Cylinder ok but key vibs
given to dia. if friction
insufficient use teeth so
lever must not exceed
to change relation

Note an oval dia
so that distance to ring
is everywhere different
from the Circle where
point is fastened

Jan 24 1895 Dra

to make a perfectly Even
product at Either point
it might be arranged so that



Adjusted as one is in as
Either Comes out,
This has the advantage also
that the reproduction is
a positive movement cant
jump & it may be important
as record will not be ~~much~~
worn much & very small
recording points used to diminish
friction

300
600 –
900

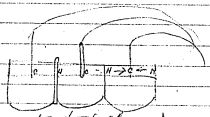
150

600
120
1200
600
720,0
9 | 720,0
40 | 8000 | 20;
800
40 –

17 | 68 | 8 | 5 | 120.
17 | 58 | 8
17 | 17
17

1
2 8.
3 7
4 2
5 20
6 35
42

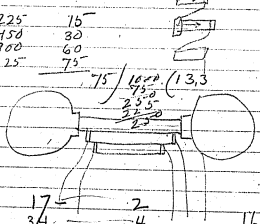
25 8000
160
160
25
40 00



13 to Volt

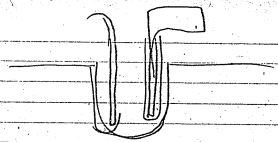
225	15
450	30
900	60
1125	75

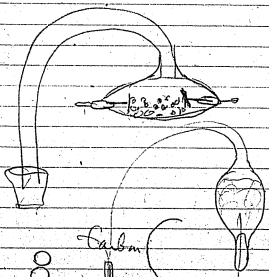
75) 1000 (13,3
75
250
225
225



17	2
34	4
68	212	8	180
136	16	93
9 times 135	22	3
32	
43	

16 % Stey
9 times





40

27 8 trucks 3500

175000

40 400 266

1600 125 4

715000

68000

2000

2500 2000

500000

13 700000 83

61

2 36

Stor

20 7000

Belts

6 400000 66666 66

17000

325000 325000

25000 2000

194000

150

150

50

5000

125 600

3

600 66000

30

3000

3 5

4

1 mile runways

52000

250

250

250

250

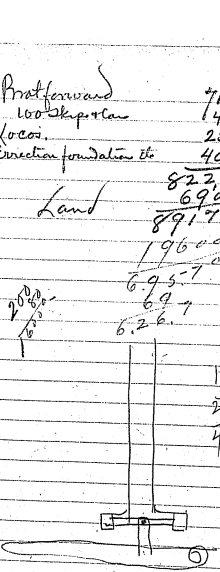
150

300

1600

5 2500 tons (80 ton bunker)	200 000	54000	
Corrugated sheets	30 000	10 000	
Steam sheets	23 000	7000	
Engines - 3 elec + pumps -	58 000	18000	
Boilers.	8 000	3000	
1 Roaster	120 000	40000	
Motors	14 000	3000	
Dynamos	10 000	3000	
Centrifugal Eng Dynamo	7 500		
Machineshop -	25 000	16000	
Dryer -	7 000	2000	
6 36" Rolls	25 000	8000	
1 5 ft Roll	9 000	3000	
6 5 ft Jigs -	24 000	8000	
Runways + Belts	57 000	12000	
Other belts.	7 500	4000	
Clinker Scraper			
2700 ft Scrapers etc 16	16 200	4000	
5 Cradles + frames	10 000	2000	
Grass all Conveyors -	5 000	1500	
Elevator -	2 000		
Coal grinding	7 500	2000	
Oil House	3 000	1000	
Rope Drive pulleys	7 000	2000	
Top Crusher plant			
Hopper 5 ft Roll, a	10 000	2500	
Hopper 36,	7 500	2000	
	715 100		

Brot forward	715 700
100 Skip & car	42 000
Locos.	25 000
Erection foundation etc	40 000
	822 700
	69 000
Land	891 700
	196 000
	695 7
	69 7
	626



- 822 700

	822 700
Piping pumps -	12 000
Reservoir -	4 000
Shovelwork + mine opening	8 000
Extra appliances roaster	10 000
Lighting	10 000
Steam piping Feedwater	10 000
Blowers -	5 000
Oil system	8 000
Steam Heat	12 000
Tracks + Ties	18 000
office + clothhouse -	6 500
Round House -	2 500
Air Compressor etc Boiler -	7 500
Shop Boiler + Heat	2 500
	938 700
	68 000
	1 006 700

460
20
920

48
12
96
48
5728

15000
1728) 34800 (20
1500 —

10
8
460
3680
1840

24
24
96
48
5184
460
1728) 460 (3.3
920
5184
5184
460
33
34
1320
1320
1584

3500

3.0
20

7500 — 300
10000 — 300
9000 300
8000 — 240
10000 400
500
200
300
30

3.0

Lead tetraphenyl etc
Jnl Chem Soc 54 1888 283
see Polis (Ber 20 3331 3336
see Chem Soc Jnl 1887 572

Dichroïns, Compounds having fluorescent & dichroic qualities
see H Brunner: J Chem Soc
Ber 21 249 256 : Chem Soc
Jnl 54 1888 p 363 —
also Kraus & Brunner
Chem Soc Jnl 1884 1354
ditto. L Ebermann C Soc Jnl
1874 693 — Ent big book

Phosphorescent Blende —
A Verneuil Compt Rendu
106 1104 1107 ditto (107) 101-104
Chem Soc Jnl / 1888 1248

Action Luc Cyanide on Metallic Chlorides by R Varet Compt Rend
106 1080 1083 also Chem Soc Jnl
1888 54 799 780 — 900

for dissolving Cellulose
Acetone chloroform Chem Soc
Jnl 1888 810
also J pr chem [2] 37
361 374

Action of Pyridine on Metallic
Salts, Chem Soc Jnl 1888
~~850 – 917~~
Gnt

Synthesis of Hydroxyquinolines Especially
Fehly & Helm Cy

Bromides of Ethyl methyl
etc Ammonias C Soc Jnl
1888 918.

Tachylite best absorbed by
95% alcohol. Sol Ag nitrate
if in excess dil precipitate,
~~also~~ all hydro-carbons of acetylene
series form compounds
insoluble crystals. See
J Chem Jnl 1888 930 –
Ent

Na & K Tungstates Equal
molecules ~~propylic~~ form
salt with Tartaric acid
C S Jnl 1888 938

Amylene Carbon Compounds Chem
C Soc Jnl 1888 941

Luminescence of Pyrogallate
C Soc Jnl 1888 1000

Action Alk Phosphates
on alk Earth fusions good
C S Jnl 1888 1033

Acetic phosphate
Magnesium group
C. S. Jnl 1888 1035 quot
fusion

Benzene derivatives of high
Molecular weight
Pentadecyl para Poly Ketone, etc
Kraft Ber 21 2265
2271 also C Soc Jnl
1888 1087 ditto 1887
252

Dichroisms Chem S Jnl
1888 1182 1183

Chl Zinc Combines with
amines & basic organic
Substances pyridine etc —
Molecular quantities — Crystals
from alcohol Chem Soc
Jnl 1888 1281

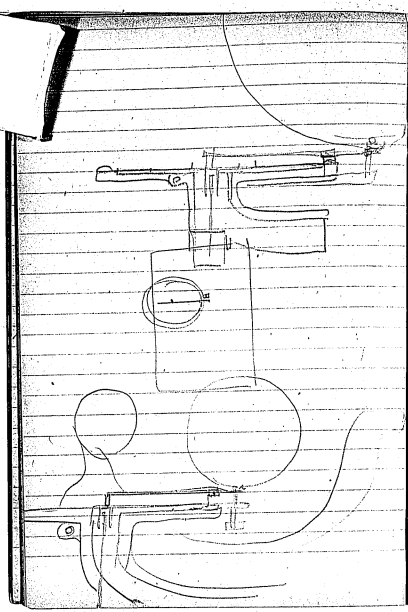
Dichroic Crystals Chem S. Jnl
1880 41
ditto p 105 106

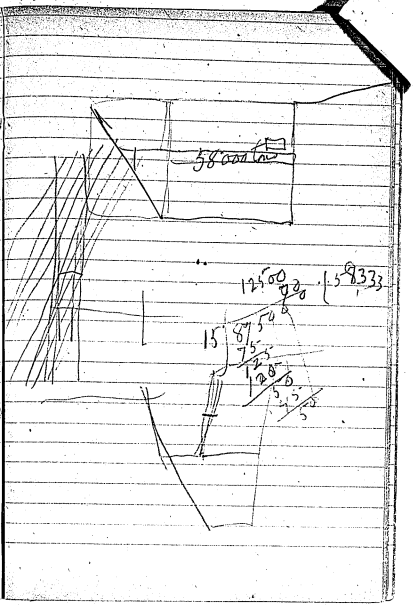
Phosphorescence in Vacuum —
Pfaundler — Ste Chem Soc
1880 204

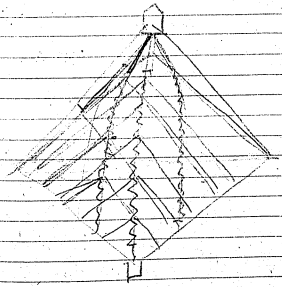
Diphenyl Salts Chem Soc
1880 476 477

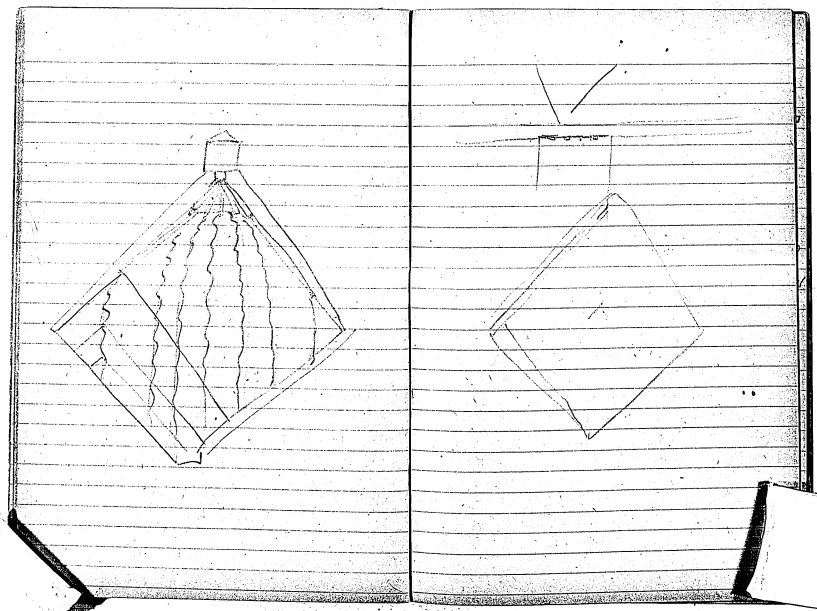
Dichroic Crystals
Chem Soc 1880 644

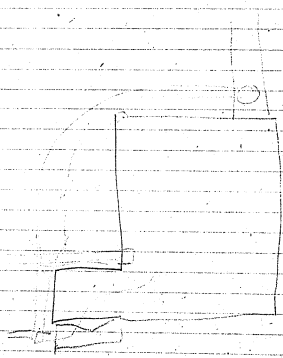
Uranium Oxyfluo Compounds
with fluorids of Alkali Metals
Chem Soc 1880 794 also
853
A Ditte Compt R 91 166 168
ditto 91 1150 Comp of Uranium
Double Salts Propionic acid
Chem S Jnl 1880 799




58 cm tan
12500
1.58333
15
75
125
5
5
5







90 140

365
20
3 00

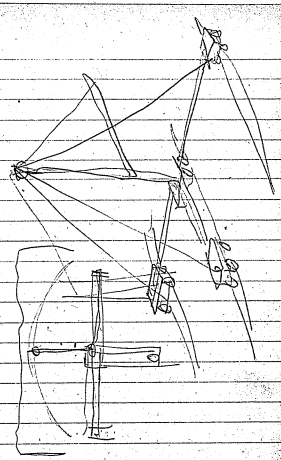
625

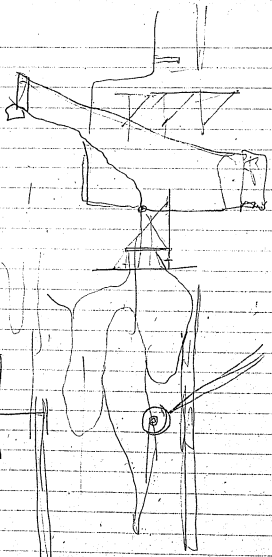
625 — 16
875
625
1000

16) 100 (.625
96
40
32
80

16	10. ~~100~~ .625
17	10.625
18	12.250
19	13.875
20	14.750
21	15.375

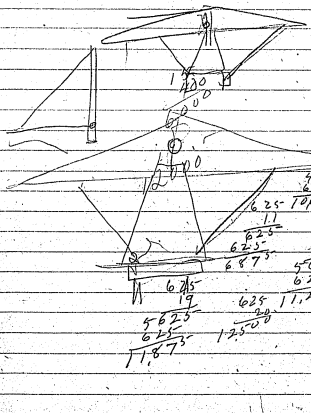
16 —	10
17	10.625
18	11.250
19	11.875

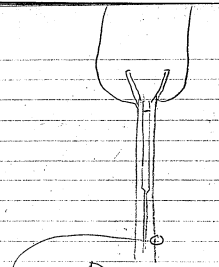


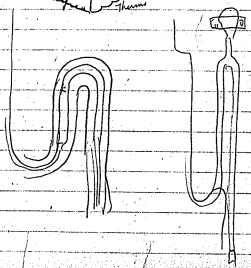


625

16	10
17	10.625
18	11.250
19	11.875
20	12.500







Formic
acetic
Propionic
Butyric
Caproic
Capryl ic
Pelagonic

Carbolic
Glycolic
Glycolic

Malic
Citric
Tartaric
pyrogallic 2'500
Acrylic
Crotonic 5/1
Angelic
Pyroterebic
Damaluric
Camphoric
Moringic
Hypogaeic
Oleic
Brassic

Oxalic
Malonic
Succinic
Lipic
Adipic
Pimelic
Suberic
Anchoic
Sebacic

Benzoic
Toluylic
Cuminic
Acrylic
Adipic

Oxybenzoic
oxytoluylic
phloretic
oxycuminic
Aconitic

Allophanic
Allanturic
Allituric
Allozonic
Allthionic

Antimonates
Oxychloride Chlorinny
Sulphantimonates

Arsenites
Arsenides
Oxychloride Barium

Double Benzoates

Bromobenzoates
Chlorobenzoates
Nitrobenzoates
Nitrochlorobenzoates

Cyanide Phenyl (Benzonitrile)
for double salts

Hydride of Benzoyl Cambium
with Chlorine also with
acid sulphites of alkali
metal

Hydrides of Nitro Benzoyl

Benzylamine (Toluidine) (C_7H_9N)
Cambium with acids

Cyano benzylamine

Bromo Nitride (Volite)

Bentes bromate by fusion
below it is a strong acid

But want all the Bromates
that can be made in such way

Bromoacetates
Dibromoacetates

Bromates (Camphoric acid)

Cyanides with Alkaloid bases
& amines –

Conine Salts of Brucine Caffeine
Quinine Strychnine
Cotarnine Quinchine Other Alkaloids

Butyrates,

Double Chloride Bromide & Iodide
of Cadmium – They form many
double salts

Chloride Cadmium form double
salts with Hydrochlorides of
organic bases. Vol 1 704

Oxychloride of Calcium
CaCl combines with ammonia
also with Chromic acid &
acetate – Oxalate Potassium

Copper Nitride will
Nitrogen dissolves in
Cyanide Potassium 5 S
Cuminic acid - good.
Nitro Cuminic acid
Hydride Cumyl unites with
acid sulphites of alkali
metals
Cyanelurico acid
Cyanide of Ethyl forms acids
Compounds with some metallic
chlorides
Sulphethylates or Mercaptides
Fumaric acid
Malic acid (Fumar)
Glyceric acid
glycollic acid

Dilituric acid, (good)

7 over 31 22 tons

13
30
12
60
300
36

730 18) (20

68
5
340
17
357

360
230

540
10
120
67

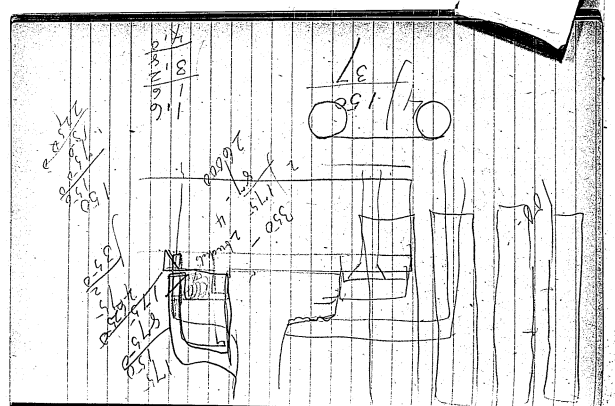
1500
14
6000
13000
68) 31
304
612

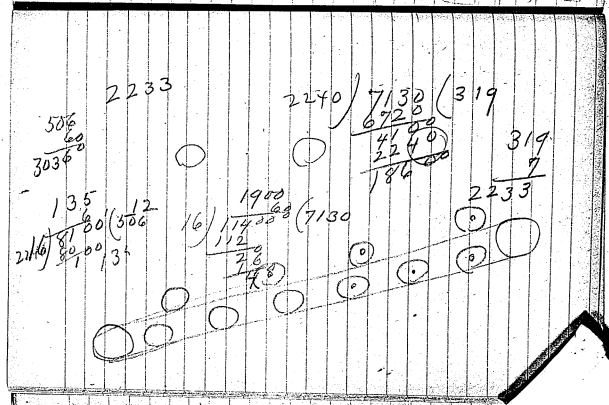
308
3
924

318
170
2226
318
3406

1350
16) 81 00 68 (5062
80
1 96 0 2240
4

5062 (2.21
4480
5 82 0
44 80
3 40 0
3 34
1326

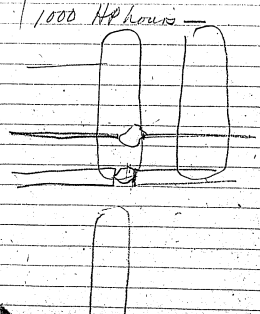



2233
2240) 7130 (319
6720
4410
2240
1840
319
7
2233
506
60
30360
135
12
506
2160) 81000 (37
1900
63
16) 1140 (7130
112
28
140

Oxide	3500
& Zinc	1500
Transfos & grids	1000
Furnaces	500
Zinc Retorts	
Roll etc	2500
	9000

Day 10 000 —

1000 HP hours —



1000 HP — 16650 lbs oxide

3333 —

16650 Zinc

1500 —

80

Cells & grids — 1000 —

20

16650 —
9

149850

50 — 3 HP hours

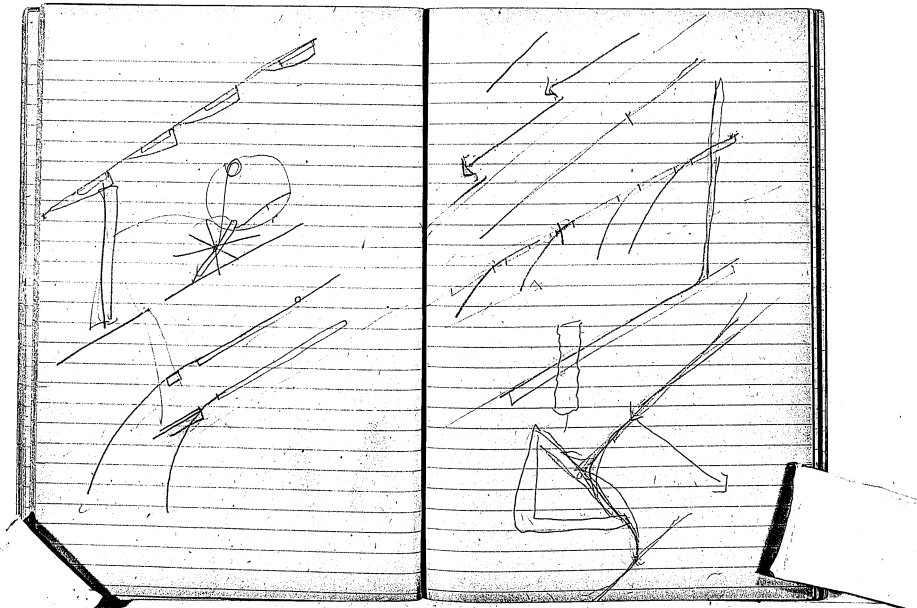
1

2 333

1000 1665000

3330

Bailed



300—

60—

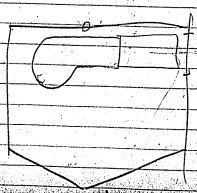
75 — 100—

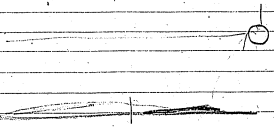
Q 21 70

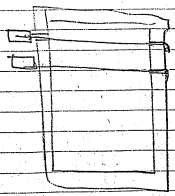
60

20

18—21







1 ft square 8 ft

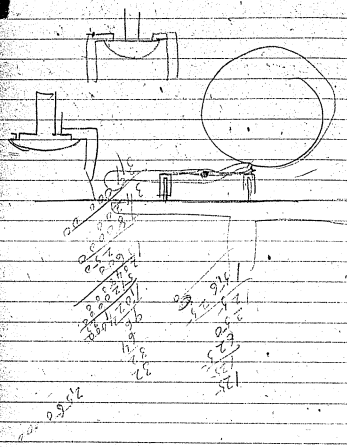
144
8
1152

8 690 1½ hp

690
44
2760
2760
2760
30

$\frac{1}{10}$ amperes per sqr inch

1 plate 1 ft. sqr corrugated
1/8 to ⅛ contact. Equals 8 ft
both sides or 1152 inches
at ⅒ amps gives 115 amp
6 plates is for 690 amperes
4 pairs 2½ Hp.



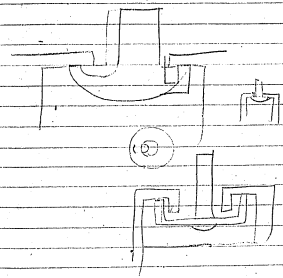
40 cells 8000 watts.

1 ton carriage 100 watts per ton 80 miles –

1% of charge is 80 watts.

If 20 lbs taken off any Motor 1 watt per pound taken off – as in above case 1% saved or if 20 lbs left off every Motor increased 1% – is saving of 80 watts.

So that if Motor can be increased in efficiency 1% – can add 20 lbs but to gain weight should be less than 20 lbs – Saving of 25 lbs means about 1 mile more.



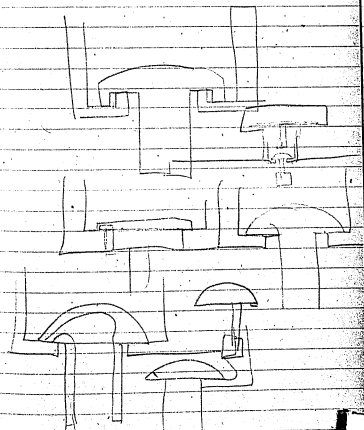
25 50

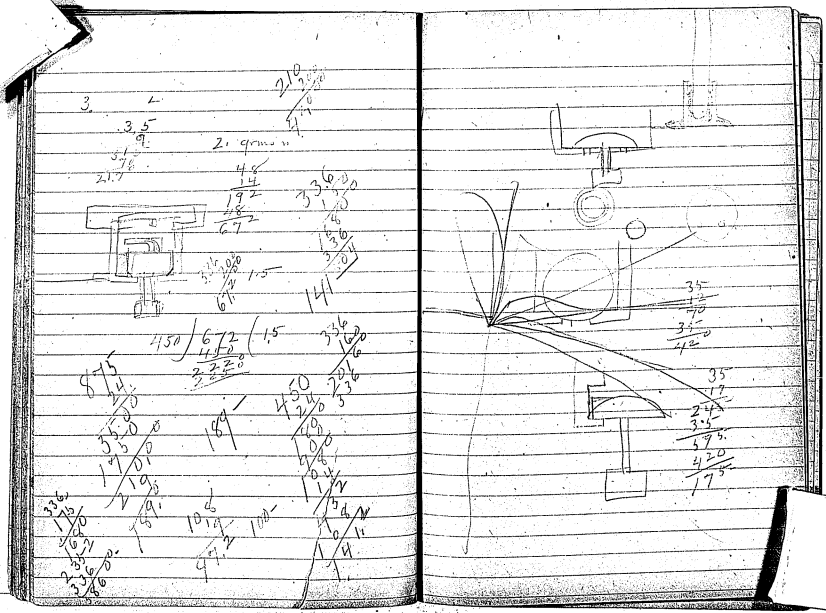
83

35

36

3 Bibs
6 Steins
6 Coasters
Pipe Rack





Hunter -

The screens in Rescreening building will be 16 high arranged same way as over

3. Height - The building should be 25 ft longer than necessary to get in.

2000 – 1000 lbs battery
600 lbs load

3600 lbs –

50 watts per 1000 lb-mile.

180 watts per mile –

100 – 38 / 700 – 52 / 200 / 1400

36 / 50 / 1800

19 | 1000 (526 / 95 / 50 / 50 / 1200

15 / 20 / 50 | 900000 / 21000000

800

135 / 52 / 270 / 27000

180 | 10400 (58 / 900 / 1400 / 1440

667 miles

270 / 675 / 900

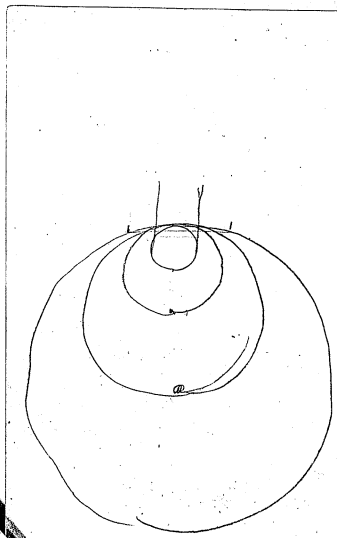
70000 / 1400

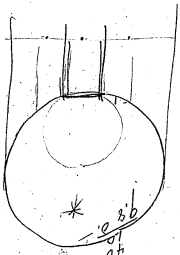
4500 | 225

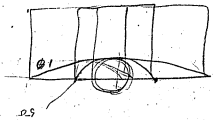
225 | 14400 / 13500 / 900

64 miles

[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]







1720
1744
1768

1000 — 172
1064 164
1128 156

1750

2125
12
4250 850
25 45 12
170
850
1020
1064
64
1128

3) 4250
1416
122
283
1416
1699

5) 4250
+850
24249
1062
12744

1720
284
1784

3000
1760
1760
1760
1064
1936

1280
1424 — 144
1616 336.
28
3
37.

66) 4250. (64.4
396
294
264
26

64
37
448
192
23.6

1064
3
3192
1768
1424

3384
1768
1616

1128
3
3384

1064) 1744 (164
1064
500
1128) 1768 (1.5
1128
6400
5640
760

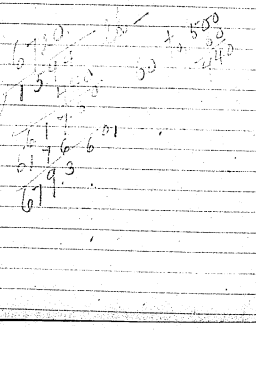
1128) 5384
4.6
5.23

1424
1280
144

1616
1280
336

350 tons –

Crude –	2½ – 6		294	
Giant.	2½	6	288	
Giant	5½	14	274	
1st 36.	5		260	
2nd 36.	10		234.	36%

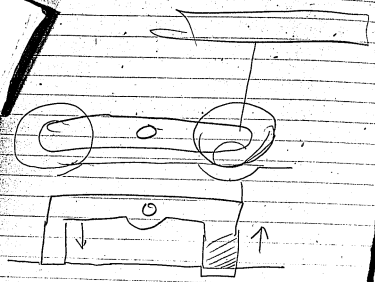


14 | 679360 | lb deg
56 | 485.2
9
112
73
65
20

78 lb hour | 37,400 | 679360 | 18.1
85 | 56000
119360
112000

234
85
149

234
34
1170
702
819

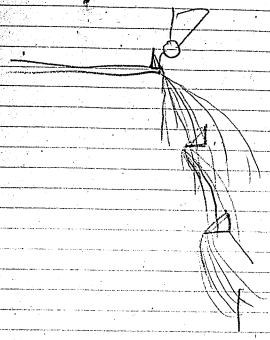


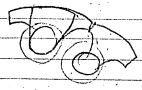
to heat 3 lbs brick to 600
50 lbs Coal,

20

15"

20"





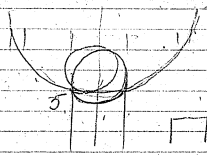
24-

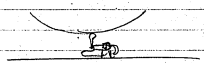
500-

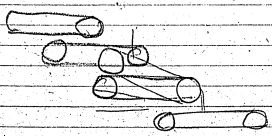
12) 250 + 20
240
10

60

110
20
200-







25800
500 Supplirs
130
26450

360 day

Dec 1st payroll - 10800
Supplirs 26450

37250

Jany 1st 37250
10800
48050

48050

Feby 48050
10800
58850

58850

360
28
288
720
1008
11

March 1st 58850
10800
69650

69650

apl - 69650
10650
80300

80300

50
6
50

200

100

3
200

25

75
15
6
30
7
54
96
25
80
337

60

24
4
96

40
135
540
540
90
30
27

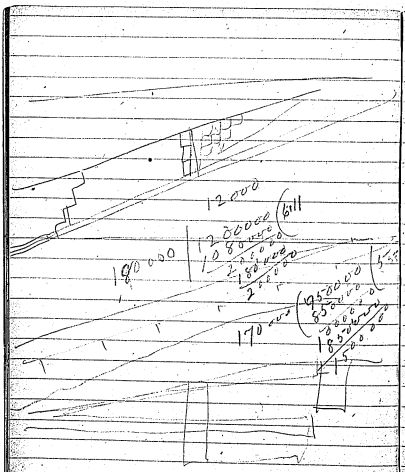
40

25
3
75

11

12000
800
980
400
300
500
2900
800
3300
1000
1200
500
425
500
75
600
125
100
75
2580
400

460
25
230
92
115



500
200
150
675
525
2400
3925
611
558

135
675

200
150
350

240

4500
350
1060
370
5710 135
810
4 250
700

5700 Say 60 day

15c 15c

400
200

160000 95 170000
611

3 | 160
53
3 102 87000
703

170000
170000
170000

Wages per mon

B. Lee	145	$66-
Sik	145	
Tappley	160	
Turner	145	
Murray	145	
Rumley	145	
Bilen	290	
Turner	145	
Drump	290	
Sykes	145	
Turner	290	
Eng.	300	
Owens	450	
Turner	400	
Grant	350	
Mirick	350	
6	870	
Mac	550	
Top	145	
Coal	270	
Bush	150	
Clem	270	
Owens	200	
Cook	300	
	6555	

140 8 50 50 670

84 200 57 565

200

365

375 / 6600 (17.6 (63 17.6 365

375 26.0 700

2625 5000 5 255.5

225 4 3 6

350 49 15.33

26 1400 60.000

4 60.000

104 375 / 1000 (28 67

6

60 375 402

250 83 600 (68

700 time 625 20

35 / 700 35 / 200 240

245 19.20

Drafting off.	8		1200	
Foundry	3	1st	450	
Power station	12		2050	
Electric	7		1150	
Oil	5	2nd	700	
Blacksmith	10		1750	
Machinists	40		8700	
Storeroom	4		700	
Watch	4	15th	700	
Yard	15	daynight	2255	
CP	31	2nd day	5105	5105
Mill 1	37	2nd day	6685	6685
Pike	41	3rd day	7140	7140
Shops 3	24	3rd day	4575	4575
Cures	8	day	1400	1400
Bobbers	25	daynight	4900	
Mineville	12	6th " "	2000	
Stripper Sh	12	daynight	2100	
Pond	1	day	200	200
Carpenters	6	day	1500	1500
Gen Sh	4	day	2700	2700
Clerks	4	"	900	900
Gen	6		1000	1000
			51205	
307		60/60		
		4		2
		10		4

	men	cost
Day shift	307	601
Night shift	162	312
	469	913

of which 45 Italians

1000 67/20000 (298 — 20 net

134

603

603

573

573

469

73

396

3

20000

23000

13

21

13

66

66

1300

80

500

3

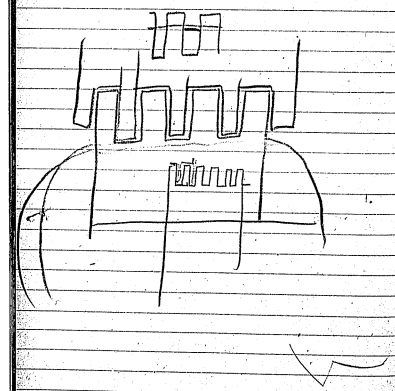
60 2

2000

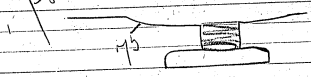
10

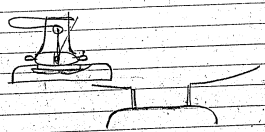
4

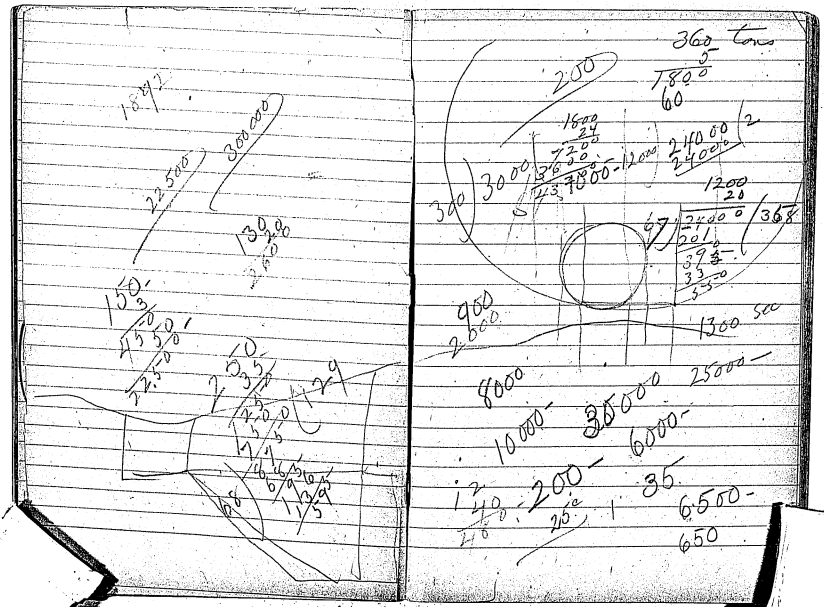
1000 Ton	67	20 net	298 Tons
1200			357
1400			416.6
1600			476
1800			535.6
2000			595
2200			654
2400			713
2600			772
2800			831
3000			890
3200			949



100 watts for 1 minute
40 cells — 80 minutes
or 1 Tim 50 watts is 1% grooves on battery
50 watts
80 watts 20 lbs per 1 minute per cent






360 tons
300000
22500
300
3000
43.7000
1200
1300 500
8000
25000
10000
30000
6000
200
35
6500
650

67) 1200 (18
67
530
530
70
21

125000

80
24
80
192
2000

24 — Cuo-H

Zuccati

240
8
1920 — 65) 3600 (530
3900
2600
530
5
2650
24
060
3000
2) 63600
31800
25
250

30000

100
60
15) 6000 (4,000
60
20
20

100 HP

2000

1000

20 tons

7

3

9

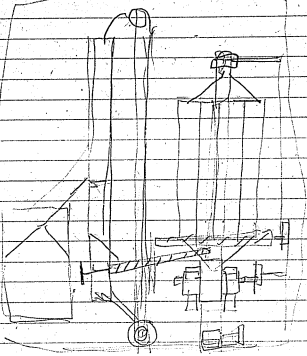
20

180

12

20

24

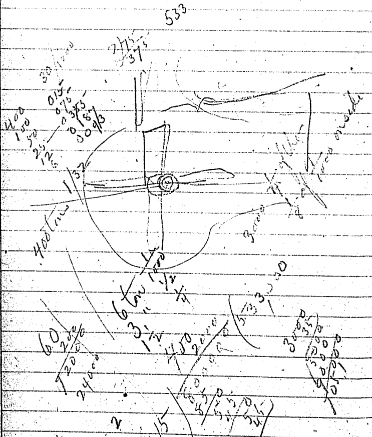


10 lb

4 0

94.07

4.5 lbs



2	300
2	600
2	300
6	900
6	900
2	300
1	175
3	500
2	270
1	175
1	150
1	135
1	100
1	300
	5105

1	150
1	150
1	175
2	350
1	170
1	200
2	350
2	350
1	175
1	175
2	340
3	525
1	160
2	320
1	160
1	200
2	300
2	300

1	300
2	375
1	135
1	350
1	350
2	350
1	300
2	300
37	6685

4 Engs	20,00
4 Fans —	12,00
2 Induction —	6,00
4 Dryers —	12,00
20 Screens	50,00
16 Blowers	48,00
4 oil —	12,00
2 Engs —	8,00
2 Helpers	6,00
6 Fans	15,00
12 Mechanics	36,00
6 Helpers	15,00
4 Boys	6,00
4 Firemen	24,00
1 Electrician	8,00
1 Supt	15,00
1 " Night	8,00
Hand gang	20,00
Residue	48,00
4 office	18,00
2 Mech Engs —	16,00
Truck gang	20,00
	473,00

shovel - 8 gangs - 200,00
Loader gang - 12 36,00
assays - 423,00
8,00
667,00

75
700

5000 | 66,700 (13,3
50,000
16,700
13,300
17

1450
6

20

6 1/4

$200
$10